

Remarks

Claims 1-4 are pending herein. By this Amendment, claims 2 and 4 have been amended.

Claims 2 and 4 (in part) have been amended to recite that the laser beam has a wavelength of 1064 nm. Support for this recitation can be found in the specification at, for example, page 3, lines 17-18.

Claim 4 also has been amended to change “semiconductor wafer” to --substrate-- to be consistent with the language of claim 3, upon which claim 4 depends.

In the Office Action, claims 1-4 are rejected under 35 U.S.C. §102(a) as being anticipated by JP 11-135390 to Masahito et al. (“Masahito”). This rejection was maintained in the Advisory Action. Applicant respectfully requests reconsideration and withdrawal of this rejection.

I. The Rejection

In the Office Action, Masahito is cited relative to instant claims 1 and 3 for disclosing a semiconductor wafer having circuits formed on the front surface of a wafer 1 (abstract, line 15) or a base plate, wherein an ID mark (see abstract, line 16) is formed in the interior of the base plate or wafer at a predetermined position devoid of the circuits (see abstract). The Office Action notes that when the laser beam is irradiated on the back or side surface of the wafer, the printed ID is left on the interior of the base plate or wafer. Regarding claims 2 and 4, Masahito is cited for teaching that the ID mark is formed by converging a laser beam (see abstract) at a focal point in the interior of the base plate or wafer.

In Applicant’s claimed semiconductor wafer (claims 1 and 2) and claimed substrate (claims 3 and 4), an ID mark is formed in the interior of the base plate. This can be seen, e.g., in Fig. 1 of the present application, wherein the ID mark is designated by reference numeral **23** and the base plate is designated by reference numeral **21**. The reference line used to indicate the ID mark is broken to indicate that the ID mark is disposed in the interior of the base plate. Figure 2 is a diagram showing how to form the ID mark in the interior of the base plate. As shown in Fig. 2, the ID mark can be formed in the interior of the base plate by converging a laser beam **30** through a FQ lens at a focal point **31** in the interior of the base plate **21**. According to amended claims 2 and 4, the ID mark is formed in the interior of the base plate by converging a laser beam having a wavelength of 1064 nm (that is, a wavelength capable of passing through a base plate) at a focal point in the interior of the base plate. As a result, only the interior of the base plate

becomes deteriorated to form the ID mark in the interior of the wafer, without producing irregularities in the front surface and the back surface of the base plate.

Masahito does not teach or suggest the formation of an ID mark in the interior of the wafer disclosed therein. Masahito expressly teaches that the ID is printed “on the back or the side surface of the wafer or on both the back and the side surface of the wafer.” The drawings in the reference further show the ID mark as being disposed on a back surface of the wafer 1. Masahito does not anywhere describe the formation of the ID mark in the interior of the wafer. As the “Problem to be Solved” therein, Masahito states the following:

To make reading and alignment of a wafer accurate, by printing an ID on ***the back or the side surface*** of the wafer or on both the back and the side surface of the wafer (emphasis added).

In the “Solution” portion of the abstract, Masahito states the following:

In an ID printing method of a wafer 1, a laser beam is concentrically irradiated or an ion beam is irradiated on ***the back or the side surface*** of the wafer 1, and ***an ID is marked on the back or the side surface*** of the wafer 1. A method irradiating a laser beam on ***the back or the side surface*** of the wafer 1, or a method irradiated an ion beam is used as a method printing ***an ID on the back or the side surface, or on both the back and the side surface of the wafer 1*** [emphasis added].

The Office Action cites Masahito’s abstract, including lines 15 and 16 thereof. At lines 14-16 of the abstract, Masahito states the following:

In the method using a laser beam, a laser beam is irradiated on the ***back or the side surface*** of the wafer, a substrate is directly shaved, and letters, marks and bar codes for ID recognition are printed [emphasis added].

Thus, Masahito does not teach forming an ID mark in the interior of the base plate but expressly teaches forming an ID mark on the back and/or the side surface of the wafer. Furthermore, Masahito does not teach forming an ID mark in the interior of the base plate using a laser beam, e.g., a laser beam having a wavelength of 1064 nm (amended claims 2 and 4). Masahito does not teach anything about the wavelength of a laser beam to be used therein. To form an ID mark on the back and/or side surface of a wafer like that taught in Masahito, generally a laser beam of a wavelength of 533 nm having absorbance is used and processing is

carried out by converging the laser beam at a focal point on the surface of the wafer. As a result, the ID mark can be formed on the back and/or side surface of the wafer by the formation of a laser processing groove, but, in such instances, irregularities are produced on the back and/or side surface of the wafer. Therefore, problems occur in that contaminants (dust) may enter into the irregularities formed on the surface of the wafer, and, consequently, the ID mark becomes difficult to be read, and also dust entering the irregularities is pollution in a clean room. Thus, in the printing method taught in Masahito, an ID mark is formed on the back and/or side surface of the wafer and produces irregularities through irradiation of a laser beam.

Therefore, Masahito does not teach or suggest a semiconductor wafer or substrate having an ID mark formed in the interior of the base plate thereof. Accordingly, for at least this reason, Masahito does not anticipate instant claims 1-4.

II. Conclusion

In view of the amendments and remarks herein, Applicant respectfully requests withdrawal of the rejection set forth in the Office Action and allowance of claims 1-4.

If any fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033773M054.

Respectfully submitted,
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Listing of Claims

Claim 1 (Original): A semiconductor wafer having circuits formed on the front surface of a base plate, wherein an ID mark is formed in the interior of the base plate at a predetermined position devoid of the circuits.

Claim 2 (Currently Amended): The semiconductor wafer according to claim 1, wherein the ID mark is formed by converging a laser beam having a wavelength of 1064 nm at a focal point in the interior of the base plate.

Claim 3 (Original): A substrate having a workpiece holding area in a base plate, wherein an ID mark is formed in the interior of the base plate at a predetermined position.

Claim 4 (Currently Amended): The ~~semiconductor wafer~~ substrate according to claim 3, wherein the ID mark is formed by converging a laser beam having a wavelength of 1064 nm at a focal point in the interior of the base plate.